AN2727
Application note

Demonstration board user guidelines for the TSC101 high-side current sense amplifier

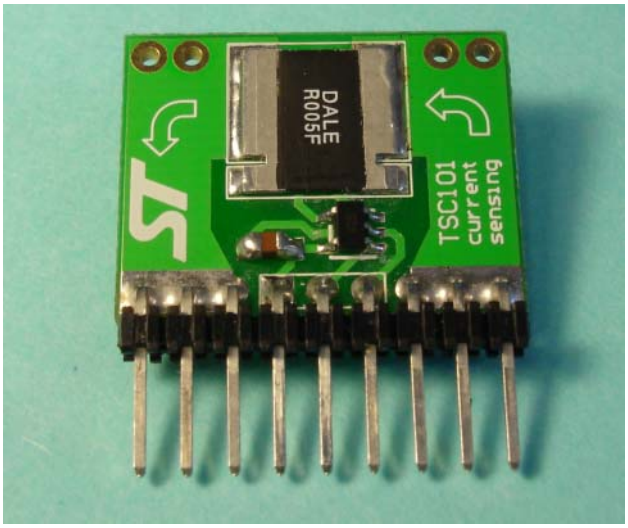
Introduction

This application note describes the DEMO_TSC101, a demonstration board specifically designed for the TSC101 integrated circuit.

In this document, you will find:

- A brief description of the TSC101
- A description of the demonstration board
- A detailed bill of materials of the demonstration board
- The layout of the demonstration board

Figure 1. Demonstration board



1 About the TSC101

The TSC101 measures a very small voltage drop on a high-side shunt resistor, and, using an internally fixed gain, amplifies the difference into a ground-referenced output voltage. The amplification gain is internally fixed and the device is housed in a tiny SOT23-5 package.

Input common-mode and power supply voltages are independent. The common-mode voltage can range from 2.8 V to 30 V in operating conditions, and up to 60 V in absolute maximum ratings. The supply voltage can range from 4 V to 24 V giving you the possibility to connect the power supply pin to either side of the shunt resistor in most cases.

Most of the TSC101 parameters are guaranteed over the full operating temperature range from -40° C to 125° C.

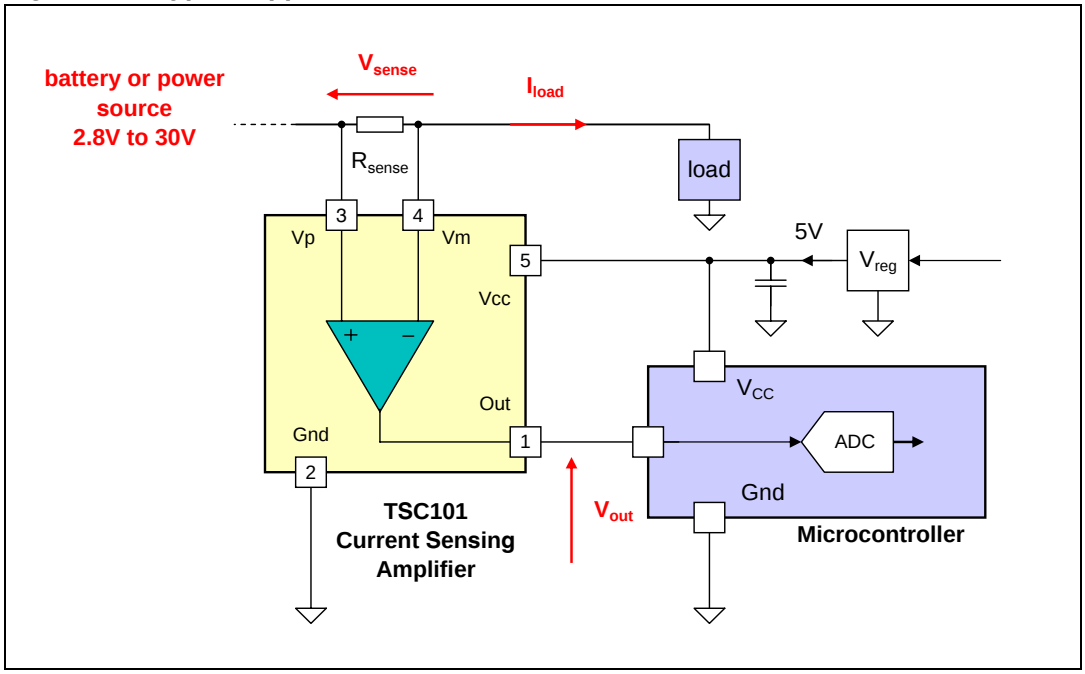
Current consumption of less than 300 µA over the temperature range and low input bias current (less than 8 µA in standard conditions, a few 100 nA if V_{CC} isn't supplied) are particularly interesting to save power in the application.

The TSC101 key features are:

- Independent supply and input common-mode voltages
- Wide common-mode operating range: 2.8 V to 30 V
- Wide common-mode surviving range: -0.3 V to 60 V (load-dump)
- Wide supply voltage range: 4 V to 24 V
- Low current consumption: I_{CC} max is 300 µA
- Internally fixed gain: 20 V/V (TSC101A), 50 V/V (TSC101B) or 100 V/V (TSC101C)
- Buffered output

For more detailed information about the TSC101, refer to the datasheet.

Figure 2. Typical application for the TSC101



2 Description of the demonstration board

The DEMO_TSC101 is a demonstration board designed to help you evaluate the performance of the TSC101.

Figure 3. Demonstration board schematic diagram

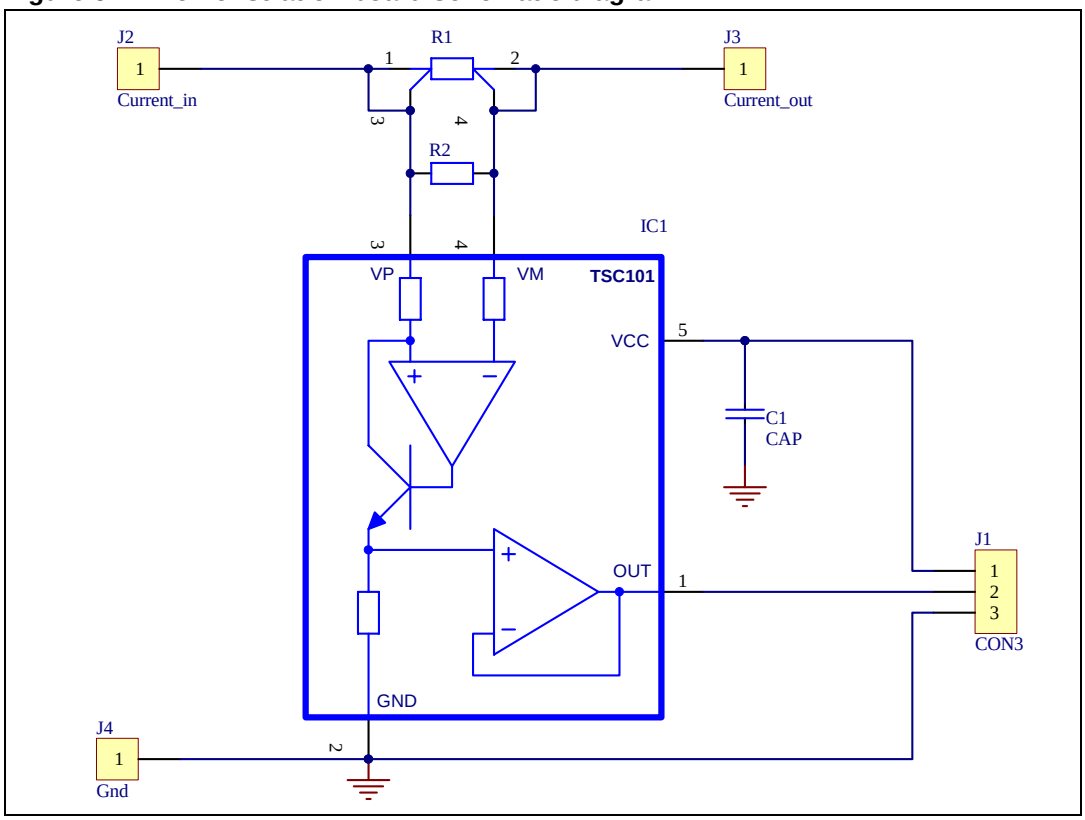


Table 1. Demonstration board bill of materials

Part	Part type	Footprint	Description	Manufacturer	Reference
IC1	TSC101B	SOT23-5	High-side current sensing amplifier	STMicroelectronics	TSC101BILT
R1	WSL3637	9.4mm x 9.14mm	5mΩ shunt resistor	Vishay Dale	
C1	100nF/X7R	0402	Supply voltage decoupling capacitor		

3 Demonstration board layout

The printed circuit board of the demonstration board has the following characteristics:

- Board dimensions: 23 mm x 18 mm
- 2-layer PCB
- PCB thickness: 0.8 mm
- FR4 material
- Copper thickness: 18 µm

Figure 4. Top view of demonstration board

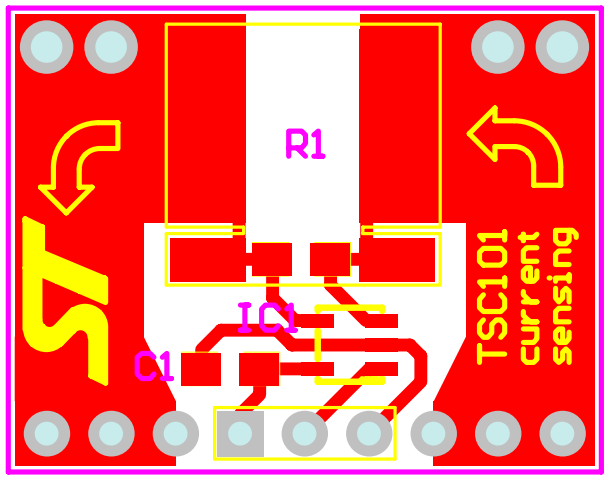
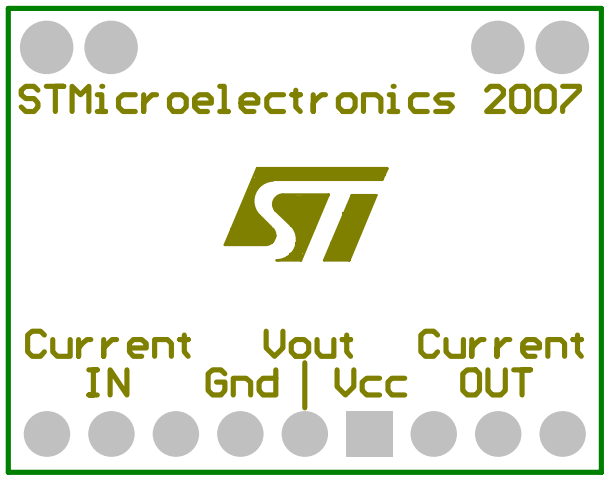


Figure 5. Bottom view of demonstration board



4 Revision history

Table 2. Document revision history

Date	Revision	Changes
3-Jun-2008	1	First release.

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